

M.G. Science Institute, Autonomous

Affiliated to Gujarat University, Ahmedabad

(Managed by The Ahmedabad Education Society)

Department of Biotechnology

Programme: Bachelor of Science (Hons.) in Biotechnology

SYLLABUS

(Effective from Academic Year 26-27)

Semester: VI	Title: Biotechnology Practicals	Credit: 4
Course Code: BTM363 (P)		8hr/week

Course Outcomes

After successful completion of this course, students will be able to:

CO1: Demonstrate the ability to navigate and retrieve biological literature and sequence data from databases such as NCBI and other primary data repositories.

CO2: Perform sequence similarity searches using BLAST and interpret the output for functional and evolutionary insights.

CO3: Carry out multiple sequence alignment using ClustalW and analyze conserved regions across DNA or protein sequences.

CO4: Explore and query protein databases such as Swiss-Prot and UniProt to extract functional, structural, and annotation data.

CO5: Apply basic statistical tools to analyze biological data, including calculation of mean, median, mode, standard deviation, and coefficient of variance.

CO6: Interpret biological datasets using statistical graphs and tests such as frequency distribution, chi-square test, and confidence intervals, including hands-on demonstration using SPSS software.

CO-PO Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	2	2	2	2			1	
CO2	3	2		3	2			2
CO3	2		2	3				
CO4	3	2	3			2		
CO5		3	3	3	2	2		
CO6	2	2		3				1

1. Introduction to literature database at NCBI
2. Retrieval of data from primary databases
3. Similarity search through BLAST.
4. Exploring and querying the protein sequence database. Swiss Prot, Uniprot
5. Biostatistics examples:
 - a. Calculation of Mean, median and mode
 - b. Frequency distribution graphs
 - c. Standard Deviation
 - d. Coefficient of Variance
 - e. Chi-square test
 - f. Demonstration to SPSS
6. Study of aeration and agitation on production of cell mass of bacterial species.
7. Study of various physical parameters on production of amylase:
 - a. pH
 - b. temperature

8. Production method of alcohol by fermentation through yeast.

References

1. *Introduction to Bioinformatics* by Lesk, A.M. (Oxford University Press)
2. *Bioinformatics: Sequence and Genome Analysis*, Mount, D.W. (Cold Spring Harbor Laboratory Press)
3. *Bioinformatics: Methods and Applications*, Rastogi, S.C., Mendiratta, N., & Rastogi, P.
4. *Biostatistics: A Foundation for Analysis in the Health Sciences*, Daniel, W.W. (Wiley)
5. *Fundamentals of Biostatistics* Rosner, B (Cengage Learning).
6. *Statistical Methods* Gupta, S.P. (S. Chand & Company)